# Alina Jade Barnett

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https://alinajadebarnett.github.io/

RESEARCH INTERESTS

I build interpretable deep learning systems with applications in computer vision, natural language processing and clinical medicine. I have published papers in NeurIPS spotlight, CVPR, Nature Machine Intelligence, and New England Journal of Medicine AI. I was PI for a $19,831 grant from the Duke Incubation Fund for interdisciplinary work on interpretable mammogram analysis. I instructed a 200-student graduate machine learning class and I have managed 12 full-time and part-time direct reports.

EDUCATION

**Duke University** — Durham, NC
Postdoctoral Research Associate (Advisor: Cynthia Rudin) — 2023 – current
Ph.D. in Computer Science (Advisor: Cynthia Rudin) — 2017 – 2023
M.S. in Computer Science (in passing)

**McMaster University** — Hamilton, ON, Canada
H.B.Sc. in Physics with co-op (summa cum laude) — 2012 – 2017

PUBLICATIONS

(* indicates co-first /co-senior authors, equal contribution)
1502 citations on Google Scholar

[1] Julia Yang, **Alina Jade Barnett**, Jon Donnelly, Satvik Kishore, Jerry Fang, Fides Regina Schwartz, Chaofan Chen, Joseph Y. Lo, Cynthia Rudin. "FPN-IAIA-BL: A Multi-Scale Interpretable Deep Learning Model for Classification of Mass Margins in Digital Mammography."
*DEF-AI-MIA **CVPR workshop**,* 2024.

[2] **Alina Jade Barnett***, Zhicheng Guo*, Jin Jing*, Wendong Ge, Brandon Westover, Cynthia Rudin. "Improving Clinician Performance in Classification of EEG Patterns on the Ictal-Interictal-Injury Continuum using Interpretable Machine Learning."
*New England Journal of Medicine AI (**NEJM AI**),* 2024.

[3] Jon Donnelly, Luke Moffett, **Alina Jade Barnett,** Hari Trivedi, Fides Schwartz, Joseph Lo*, Cynthia Rudin*. "AsymMirai: Interpretable Breast Cancer Risk Prediction from Mammograms."
***Radiology***, 2024.

[4] Dennis Tang, Frank Willard, Ronan Tegerdine, Luke Triplett, Jon Donnelly, Luke Moffett, Lesia Semenova, **Alina Jade Barnett**, Jin Jing, Cynthia Rudin, Brandon Westover. "ProtoEEGNet: an interpretable approach for detecting interictal epileptiform discharges."
*Medical Imaging meets **NeurIPS workshop**,* 2023.

[5] Yanchen Jessie Ou*, **Alina Jade Barnett***, Anika Mitra*, Fides Regina Schwartz, Chaofan Chen, Lars Grimm, Joseph Lo, Cynthia Rudin. "A User Interface to Communicate Interpretable AI Decisions to Radiologists."
*Medical Imaging: Image Perception, Observer Performance, and Technology Assessment (**SPIE**),* 2023.

[6] **Alina Jade Barnett**, Vaibhav Sharma, Neel Gajjar, Jerry Fang, Fides Regina Schwartz, Chaofan Chen, Joseph Lo, Cynthia Rudin. "Interpretable Deep Learning Models for Better Clinician-AI Communication in Clinical Mammography."
*Medical Imaging: Image Perception, Observer Performance, and Technology Assessment (**SPIE**),* 2022.

[7] Jon Donnelly, **Alina Jade Barnett**, Chaofan Chen. "Deformable ProtoPNet: An Interpretable Image Classifier Using Deformable Prototypes."
*Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. (**CVPR**)*, 2022.

[8] **Alina Jade Barnett**, Fides Regina Schwartz, Chaofan Tao, Chaofan Chen, Yinhao Ren, Joseph Lo, Cynthia Rudin. "A Case-based Interpretable Deep Learning Model for Classification of Mass Lesions in Digital Mammography."
*Nature Machine Intelligence (**NMI**)*, 2021.

[9] **Alina Jade Barnett**, Fides Regina Schwartz, Chaofan Tao, Chaofan Chen, Yinhao Ren, Joseph Lo, Cynthia Rudin. "Interpretable Mammographic Image Classification using Cased-Based Reasoning and Deep Learning."
***IJCAI**-21 Workshop on Deep Learning, Case-Based Reasoning, and AutoML: Present and Future Synergies*, 2021.

[10] Chaofan Chen*, Oscar Li*, Chaofan Tao, **Alina Jade** Barnett, Jonathan Su, Cynthia Rudin. "This Looks Like That: Deep Learning for Interpretable Image Recognition."
*Advances in Neural Information Processing Systems 32 (**NeurIPS Spotlight**)*, 2019.

WORKING PAPERS

[11] Vaibhav Sharma, **Alina Jade Barnett**, Julia Yang, Sangwook Cheon, Giyoung Kim, Neal Hall, Avivah Wang, Fides Regina Schwartz, Chaofan Chen, Lars Grimm, Joseph Lo Cynthia Rudin. "Improving Annotation Efficiency for Fully Labelling a Breast Mass Segmentation Dataset."

[12] Luke Moffet, **Alina Jade Barnett**, Jon Donnelly, Fides Schwartz, Hari Trivedi, Joseph Lo, Cynthia Rudin. "Multi-site validation of an interpretable model to analyze breast masses."

[13] Frank Willard, Luke Moffett, Emmanuel Mokel, Jon Donnelly, Stark Guo, Julia Yang, Giyoung Kim, **Alina Jade Barnett**, Cynthia Rudin. "This Looks Better than That: Better Interpretable Models with ProtoPNeXt."

GRANTS

PI: PI for $19,831.00 Duke Incubation Fund Award from the Duke Innovation & Entrepreneurship Initiative. A multi-department interdisciplinary project for superior interpretability on neural networks that analyze mammograms. 2019–2021

INVITED TALKS

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| INFORMS Annual Meeting | 2024 |
| IC2S2 Tutorial | 2024 |
| JSM IOL Tutorial (jointly) | 2023 |
| INFORMS Annual Meeting | 2022 |
| Responsible Machine Learning | 2021 |
| Energy Data Analytics Symposium | 2020 |
| Canadian Undergraduate Physics Conference (1st place poster award) | 2016 |
| Canadian Association of Physicists Congress | 2014 |
| Canadian Undergraduate Physics Conference (2nd place talk award) | 2014 |
| Annual Soft-Condensed Matter and Biophysics Retreat | 2013 |

SELECTED AWARDS

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|---|---|
| TRIPODS Fellowship | 2021 |
| Energy Data Analytics Fellowship | 2019 – 2021 |
| AI for Art, Duke University $2500: A competition for art made using AI | 2019 |

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| | SAMSI Fellowship | 2019 |
| | Ph.D. Fellowship, Duke Computer Science | 2017 – 2018 |
| | NSERC IUSRA Natural Sciences & Engineering Research Council Industrial Undergraduate Student Research Award | 2015 |
| | NSERC USRA Natural Sciences & Engineering Research Council Undergraduate Student Research Award | 2014 |
| | The Catherine & Albert Roeder Memorial Scholarship (highest cumulative average in Honours Physics) | 2014 |

**TEACHING**

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|---|---|
| Co-Instructor, Graduate Theory and Algorithms for Machine Learning 671D | Fall 2023 |
| TA, Graduate Artificial Intelligence | Fall 2018 |
| TA, Undergraduate Artificial Intelligence | Spring 2018 |
| TA, Physics for the Life Sciences | Fall 2014 |
| Private Tutoring | 2010 – 2016, 2020 – present |

**MENTORING**

Yanchen Jessie Ou (now at Meta)
Jon Donnelly (now PhD student at Duke)
Chaofan (Daniel) Tao (now at Meta)
Lei Chen (now at HP Labs)

Satvik Kishore (now at Cargill)
Julia Yang
Frankie Willard
Dennis Tang
Rohan Bhansali
Ronan Tegerdine
Zhicheng Guo

CS+ Mentoring 2020 – 2023:
Vaibhav Sharma
Anika Mitra
Jerry Fang

Neel Gajjar
Celeste A'Brassard

**SELECTED SERVICE**

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| Reviewer: CVPR 2023, WACV 2023, ICCV, AIES, various other journals, several interpretability/explainability workshops | 2018 – present |
| FEMMES+ Activity Coordinator (middle school outreach) | 2023 |
| CS+ Speaker and Mentor | 2020 – 2023 |
| Graduate Student Affairs Student Liaison | 2018 – 2023 |
| Panel Member for Women in Computer Science Events | 2018 – 2023 |
| CS Social Committee: Co-chair; Chair; Alcohol Coordinator | 2018 – 2021 |
| Hiring Committee for Department Administrative Staff Members | 2018; 2021 |
| Office of Institutional Equity: Harassment Grievance Appeals Board Member; Harassment Grievance Board Member | 2017 – 2020 |
| Graduate and Professional School Council Special Parking Task Force | 2019 – 2020 |
| Mentor for LLC Ladies Learning Code | 2017 |
| Physics Talk Judge for Canadian Undergraduate Physics Conference | 2017 |
| Physics Outreach Volunteer, Lab Demonstrator | 2013 – 2017 |
| Science & Engineering Fair Judge | 2014 |

**PROFESSIONAL EXPERIENCE**

**Duke University** — Durham, NC
Postdoctoral Research Associate, PhD, MS — 2017 – present

- Idea development, hiring, project assignments, implementation of novel ML architectures, data management and preparation, team coordination and management of 12 direct reports for the Interpretable Mammography Lab which publishes research on human-understandable deep learning models to assist clinicians with breast cancer diagnosis and prediction.

**Kitware Inc.** — Clifton Park, NY
Research Internship — 05/2019 – 08/2019

- DARPA XAI Explanations for content-based image retrieval.
- Individual responsible for entire project pipeline: Experiment proposal, coordination with grant evaluation committee, implementation in Python, code management, launch on AMTurk, data analysis and report preparation for results.

**Government of Canada** Ottawa, ON
Software Systems Developer Internship 09/2016 – 12/2016

**Undergraduate Research Internships** Canada
McMaster University, Brockhouse Institute of Materials Research 04/2016 – 08/2016
Sidense Corp., Simulations of Ultrathin Silicon Films 05/2015 – 08/2015
E-One Moli Energy, Battery Technology Benchwork 01/2015 – 04/2015
University of Toronto, Icicle Growth Lab 04/2014 – 08/2014